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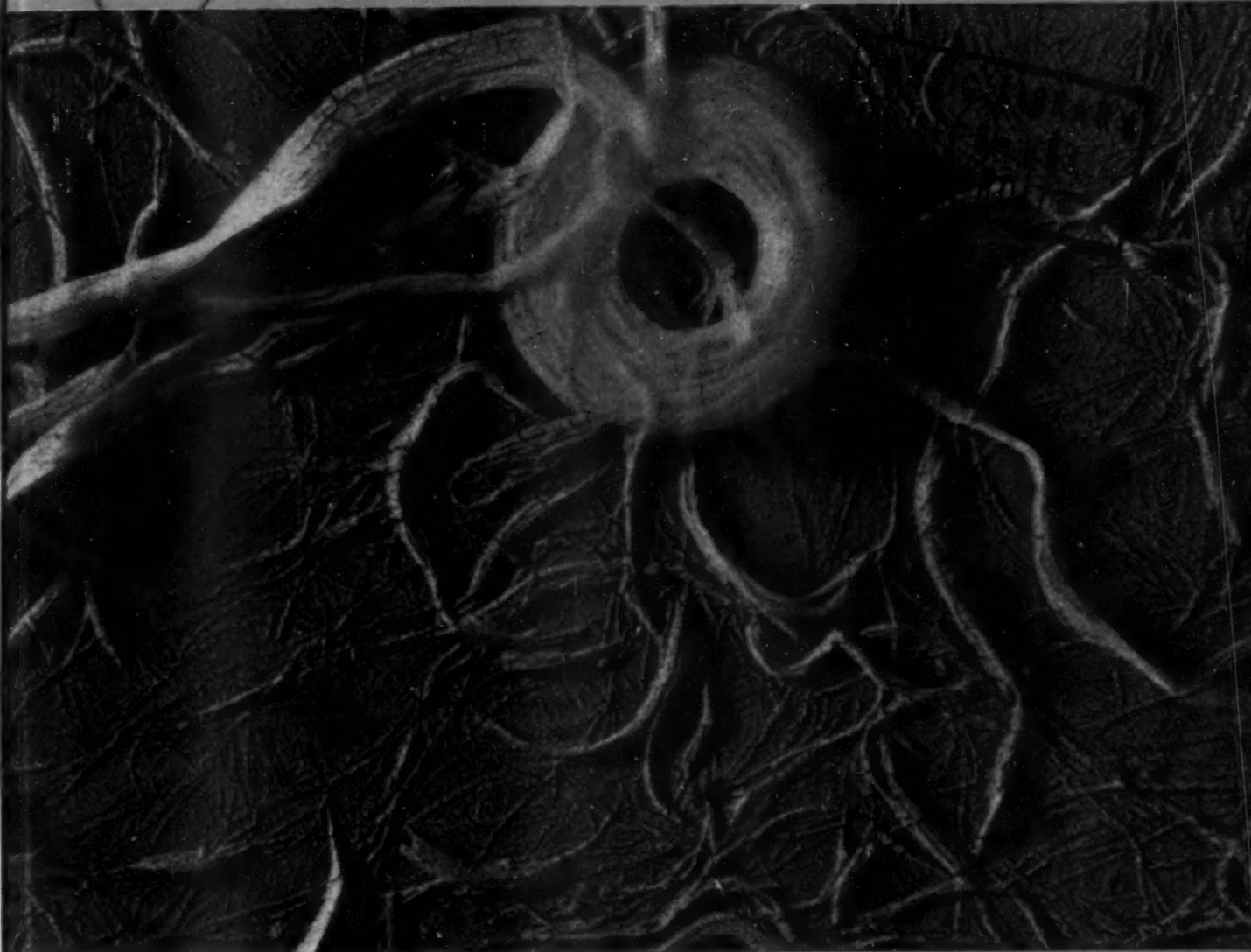
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TECHNOLOGY DEPT.
August 29, 1953

VOL. 64, NO. 9 PAGES 129-144

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Slippery
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A SCIENCE SERVICE PUBLICATION

ASTRONOMY

No Limit on Power

Water-filled tubes exposed on the moon at points where the sun is directly overhead can furnish almost unlimited power for engineering projects.

► ON THE moon, man can have as much power as he wants. The sun will act as a perpetual fuel source in lunar steam engines. Thus man can undertake engineering projects that he would not dream of starting on earth, and practically the only cost will be that of first installation.

This unlimited power will come from water-filled tubes exposed at a point where the sun is directly overhead. Such "subsolar points" form a belt around the moon. The tubes will need merely to be mounted parallel to the moon's axis within this belt and turned slowly westward, Dr. Dinsmore Alter, director of the Griffith Observatory, Los Angeles, points out.

The temperature at the subsolar point is just above the boiling point of water as we know it at the earth's surface.

"Water tubes, blackened to cause maximum absorption and mounted in cylindrical reflectors, may be exposed to the direct radiation of the sun for the equivalent of two of our weeks without any interruption," Dr. Alter will state in a forthcoming book, "Introduction to the Moon." Using such tubes, the sun will furnish as much

power as desired on the moon by man.

The rising and setting of the earth, as seen from the narrow belt around the moon where the earth is visible only near the horizon, he points out, will be different from anything experienced on this planet:

"The earth will rise above the horizon for a few degrees, then back down again. Depending on the position of the observer, it may rise in the north, south, east or west. Having risen, it may move sideways for a few degrees before it returns to the horizon."

The airless condition of the moon will make it possible for the temperature to be predicted with great accuracy for any desired time in the future, Dr. Alter states. It will be directly related to the time of day, the position on the moon, the moon's movements and its distance from the sun.

Of great convenience to astronomers on the moon who wish to make stellar photographs, he points out, will be the slowness of movement of the stars across the dark sky, as well as the extremely thin, or total lack of atmosphere.

Science News Letter, August 29, 1953

SURGERY

Relief for Hypertension

► PATIENTS WITH severe high blood pressure can live longer if given a nerve-cutting operation called splanchnicectomy than if treated medically.

Figures showing this are reported by Drs. Reginald H. Smithwick and Jesse E. Thompson of Boston in the *Journal of the American Medical Association* (Aug. 15).

Their figures cover 1,266 patients operated on and 467 who were offered the operation but for one reason or another declined and were given medical treatment. These served as "controls" for comparing the effect of the operation on survival.

Of the medically treated group, 54% had died within five years. Of those operated on, 19% had died within five years after the operation.

When graded in four groups according to severity of the disease, the survival was better for the operated ones in each group. The difference was especially marked for groups two and three and the Boston doctors recommend the operation as "the treatment of first choice" in such cases. They stress that patients should be operated on before they fall into the fourth group, since eventual mortality is high for

this group regardless of the treatment given.

Results are good in terms of survival and relief of complications after the operation even when the blood pressure is not greatly lowered, they point out.

Science News Letter, August 29, 1953

ANIMAL PSYCHOLOGY

Dog Can Be Trained For Apartment Life

► PUPPIES CAN be trained to live in an apartment without unhappiness for themselves, their owners, other tenants or the landlord, Clarence J. Pfaffenberger of San Francisco believes.

Mr. Pfaffenberger, vice-president of Guide Dogs for the Blind, Inc., of San Francisco, is a Guggenheim Fellow at the Jackson Laboratory, Bar Harbor, Me., where he is doing research this summer in puppy selection for training purposes.

Contrary to the general idea that dogs suffer from being cooped up in an apartment without a chance to run and play actively, Mr. Pfaffenberger says:

"Dogs like mental exercise better than physical exercise anyway."

He advises prospective dog owners to get a very young puppy, six weeks at the oldest. For apartment living puppies, he has designed a wire-bottom pen not unlike a child's play pen. In this the puppy is safe and clean. The pen keeps him from destroying valuables and soiling carpets, automatically housebreaks him and makes him consider it a treat when he is taken out for a romp.

Science News Letter, August 29, 1953

PHYSIOLOGY

Brain Waves Abnormal In Blood Disorder

► TOO MANY platelets in the blood, found in polycythemia, Hodgkin's disease and chronic myelocytic leukemia, may cause significant abnormalities in brain wave patterns, Dr. Samuel M. Tarnower of Pittsfield, Mass., reported at the Third International Congress of Electroencephalography and Clinical Neurology in Boston.

Platelets are colorless cells found in the blood and believed to play a role in blood clotting. Neurological symptoms, from headache to confusion and memory loss and numbness or burning of hands and feet, are commonly found in diseases in which the number of blood platelets is increased.

But two patients Dr. Tarnower reported, one of polycythemia and the other of a kind of leukemia, showed very little in the way of neurological complaints and findings. This was in marked contrast to the profound changes in the brain wave records of the two patients.

Science News Letter, August 29, 1953

VETERINARY MEDICINE

Cattle Threatened by Disease From Dogs

► DISCOVERY OF toxoplasmosis, a parasitic infection, in cattle for the first time presents a possible new threat to cattle production, officials of the American Veterinary Medical Association warn.

The disease has already caused scattered losses in Ohio cattle herds, research workers at Ohio State University College of Veterinary Medicine report.

The disease, caused by a one-celled organism called *Toxoplasma*, is a natural though rare infection of dogs, rabbits, guinea pigs, wild birds and man. Swine have contracted the disease from dogs.

The disease may produce nervous symptoms in dogs. In cattle it causes sneezing and coughing, followed by rapid breathing, frothing, trembling and head shaking. Loss of appetite, weakness and prostration usually precede death.

No successful treatment for the disease has yet been found.

Science News Letter, August 29, 1953

DENTISTRY

Testing Dentifrices

Carefully controlled tests covering a period of years are needed to get sufficient data to show that dental powders and pastes have anti-carries value.

➤ AT LEAST two or three years of carefully controlled tests on several thousand children are needed to show whether or not a particular toothpaste or powder or mouth wash can check tooth decay. The tests, moreover, should be made by several independent investigators.

This is the opinion of scientists at the National Institute of Dental Health, Public Health Service, and of the American Dental Association.

Both of these groups are unhappy about advertising claims for new dentifrices that lead the public to think the dentifrices will check tooth decay, when the claims are based only on theory and tests on laboratory rats.

At the National Institute of Dental Health, for example, scientists found penicillin very active in reducing caries, or tooth decay, in white rats in the laboratory. Trials were then made on humans. The first two were negative. The third was positive. The fourth was negative. The conclusion is that in clinical trials on children penicillin caused no significant change in the caries picture. Yet the experiments with the laboratory rats looked very promising.

Laboratory experiments with animals are needed, but one question in the past has been whether the decay in rats' teeth is the same as that in humans. Scientists now think they have a diet that will produce in rats a kind of caries much closer to that in humans. With this caries, it may be possible to tell more truly from rat experiments what a dentifrice might do for human caries.

When a new dentifrice is tested, it should cover not only several thousand children for many years but also children of wide age spread. They should be in the six- to 17-year-age group, the period when their teeth are highly susceptible to decay. And the tests must run for years because, while caries may develop very fast, there may be periods of months or years in which the process is dormant and the child has no decay.

If he has been using the new, supposedly caries-checking dentifrice during that period, the lack of decay would be attributed to the new dentifrice although actually it would have occurred anyway.

Some tests of the caries-checking ability of fluoridated drinking water, for example, are being run for ten years, although there is a generations-long history of people drinking naturally fluoridated water showing an anti-carries effect.

Some dental authorities also are worried that the public may be disappointed too often by glowing claims for dentifrices which do not hold up in actual experience. Then, some day if something really effective is discovered, the public may refuse to use it.

Science News Letter, August 29, 1953

PLANT PATHOLOGY

Beetle Indicted as Spreader of Oak Wilt

➤ A TINY black beetle has been indicted as a "typhoid Mary" for the spread of the deadly tree disease, oak wilt, by two separate "grand juries" of scientists.

Investigations disclosed simultaneously to the U. S. Department of Agriculture by researchers in Iowa and West Virginia show that glistening black, sap-loving beetles of the family *Nitidulidae* can spread the fungus disease from infected to healthy trees.

The disease is spread in an infected area

by passing from root to root underground. But how the fungus could be transmitted from old infection sites to new areas was unknown until the discovery of the nitidulid beetles' ability to spread it.

Dr. Dale M. Norris, Jr., working jointly with the National Oak Wilt Research Committee and the Iowa State Conservation Commission, reported his experiments from Iowa.

F. F. Jewell and Drs. C. K. Dorsey, J. G. Leach and R. P. True of the department of plant pathology, West Virginia University, carried out the West Virginia studies.

Both groups of researchers took nitidulid beetles feeding from infected oaks and transplanted them to wounds made in isolated healthy oaks. Infection of the trees following the "inoculation" with the beetles showed the beetles could spread the fungus to healthy oaks.

Dr. Norris discovered that as few as two nitidulid beetles collected under natural conditions can carry a sufficient load of oak wilt fungus inoculum to infect a tree through a fresh wound in three weeks.

Five healthy trees out of six on which exposed nitidulid beetles had been placed over wounds showed oak wilt symptoms in five weeks, the West Virginia researchers found.

"The production of the disease experimentally . . . seems to justify the conclusion that they (the beetles) are important vectors in nature," the West Virginia group said.

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BABY GAUR—This flop-eared, new-born gaur is being carefully protected by its mother at the National Zoological Park in Washington. The gaur is an East Indian species of wild cattle.

PHYSIOLOGY

Study Brain's Operation

► WHY THE brain operates as it does and why it gets sick is being learned by linking up its remoter parts in unique kinds of electrical hookups.

The connections have been devised by medical scientists of the University of California at Los Angeles and Long Beach Veterans Hospital and used on experimental monkeys and rabbits.

Tiny electrodes are implanted permanently in the animals' brain centers. The electrodes can be wired to sensitive instruments which record "brain waves." Interpretation of the waves furnishes clues to what goes on in various parts of the brain.

One such study involves the hippocampus, a brain center whose function long has been a mystery to scientists. Studies

with rabbits indicate it receives messages from the senses and alerts the body for necessary action.

The smell of a carrot, the sight of a rabbit of the opposite sex, a sudden noise or touch of the body all cause radical changes in wave patterns of the rabbit hippocampus.

In other phases of the research, lesions are placed in the brain to block these responses. Reactions induced in this manner are somewhat similar to those resulting from maladies caused by brain injuries. Thus a new insight into such maladies may be gained through the work.

The research is under the direction of Dr. J. D. Green, associate professor of anatomy at the U.C.L.A. Medical School.

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MEDICINE

Celiac Disease Babies

► BABIES WITH celiac disease made headlines during the banana shortage of World War II. Today the news about them is that wheat gluten, which is the protein part of wheat, is bad for them.

This discovery, by Drs. J. H. van de Kamer and H. A. Weijers of Utrecht, Holland, is relayed to American physicians by the Nutrition Foundation in New York.

Whenever the diet of celiac disease babies or children contained wheat, even in very small quantities, the patients became pale, lost their appetite, lost weight, got diarrhea and had fatty stools. As soon as the wheat flour was left out of the diet, the unfavorable symptoms became less marked or disappeared entirely. The general condition of the child also improved.

This improvement took place even if wheat starch was left in the diet.

These "dramatic findings" have been confirmed by scientists in England.

The Dutch scientists have continued their studies and now believe it is the gliadin in the wheat gluten that is responsible. The good effects of the banana diet and the fruit-vegetable diet, used when bananas were unavailable, may be explained by the lack of wheat in these diets. Relapses when children were on these diets probably came because wheat and wheat products were not rigorously excluded.

Olive oil, soybean oil and other unsaturated oils, the Dutch scientists also find, are better for celiac disease patients than butter, beef fat and coconut oil.

Celiac disease usually shows itself between the first and fifth year of life. It starts gradually. When fully developed, its signs are extreme emaciation of the trunk, arms and legs, swollen belly, a dandruff-like scalp condition and mental changes. The stools are voluminous and fatty.

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VETERINARY MEDICINE

Investigate Pet Deaths

► DETECTION OF the cause of criminal or accidental violent deaths is standard operating procedure at the Connecticut Agricultural Experiment Station, reports Dr. Harry J. Fisher of the Station's analytical chemistry department.

The victims are animals—a large number of pet dogs and, less frequently, farm animals or other pets that mysteriously sicken and die. The supposition is that the animals are poisoned; the job is to find out if they were poisoned, what kind of poison was used and how the unfortunate animals got it.

During 1952, Dr. Fisher said, the station laboratory examined 182 animals that died under mysterious circumstances. Poisons were found in 78 cases.

The most common poison found was lead, with 32 cases. Zinc followed in frequency, with 25 deaths. Other poisons uncovered included mercury, cadmium, DDT, nitrophenide, arsenic, antimony, cyanide and strychnine.

The only way of knowing for sure that an animal has been poisoned is to discover the poison in its body—usually after complicated chemical tests. Often accusations

of malicious poisoning can be disproved as a result of laboratory tests.

During a recent epidemic of dog deaths in a Connecticut county, the citizens were convinced that the dogs were being deliberately poisoned. Parents feared that their children might pick up some of the poison and be killed. One woman snatched a suspicious material from the mouth of her dog, and this, with some organs of dead animals, was sent to the laboratory for analysis.

All tests for poisons turned out negative. The "mysterious material" was a harmless cosmetic.

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SCIENCE NEWS LETTER

VOL. 64 AUGUST 29, 1953 NO. 9

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N. W., Washington 6, D. C., NORTH 7-2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

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Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C., under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 3440, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925; 39 U. S. Code 283), authorized February 28, 1950. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 1 E. 54th St., New York 22, Eldorado 5-5666, and 360 N. Michigan Ave., Chicago 11, State 2-4822.

SCIENCE SERVICE

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AVIATION

Aid for Plane Landings

► THE WATCHFUL eye of a new breed of radar has gone into 24-hour-a-day operation at the municipal airport in Norfolk, Va., to aid in establishing better air traffic and landing patterns.

The radar's rotating antenna throws out an electronic beam that scans the sky 30 to 60 miles from the airport. Airplanes reflect "echoes" to the antenna. These echoes appear as "pips" on the radar screen. Stationary objects, such as buildings, are not traced on the picture tube's face. This makes it easier for the operator to distinguish approaching aircraft.

Map overlays can be placed over the radar screen to show the locations of all high obstructions dangerous to approaching planes. During periods of poor visibility, the operator can direct planes safely past these obstacles by radio.

Designed and built by General Electric engineers, the radar has been approved by the Civil Aeronautics Administration. It was created because better means of controlling the approach and landings of aircraft were needed.

During periods of poor visibility, the new radar can be used with the airport's precision approach control aids. This permits the airport control tower to schedule the arrival of inbound planes so they can be "fed" into the precision approach control system at a rate that is both the most efficient and the safest.

The radar antenna and receiving set can be situated two miles from the airport, if such a site yields better range and perform-



SCREEN OF NEW RADAR — The location of all moving aircraft within 30-to-60-mile radius can be spotted with this new radar.

ance. The picture is fed via coaxial cable to a viewing screen in the control tower.

Sixteen airports now have been outfitted with the radars. However, the Norfolk municipal airport is the first landing field to have its set commissioned for operation. Other airports now are awaiting the new equipment.

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MEDICINE

Headaches From Anxiety

► THE HEADACHES so many high blood pressure patients have are usually due to anxiety, or worry over having high blood pressure, rather than to the high blood pressure itself.

A study of 200 patients with severe high blood pressure and of a number of controls shows this, Dr. I. McD. G. Stewart of the University of Bristol and United Bristol Hospitals declares.

Of 104 patients who had high blood pressure without knowing it, only three volunteered the statement that they had headaches. Another 14 admitted having headaches when questioned. But of 96 patients with equally high blood pressures who knew they had this condition, 71 complained of headache, most of them in terms characteristic of anxiety.

Another 18 complained, "with abundant organic justification," of something else than headache, such as the pain of angina pectoris, visual disturbances and the pain of ulcers or cancers which they had in addi-

tion to the high blood pressure. "One stalwart" declared that he felt "perfectly fit," though he had as severe high blood pressure as others in the group.

Nerve-cutting operations and new drugs for lowering blood pressure may prolong life, postpone heart failure and improve visual difficulties. But, Dr. Stewart points out in *Lancet* (June 27), measure for remedying high blood pressure should not be judged on the basis of relief of headache because this symptom is so often a product of anxiety rather than high blood pressure.

The anxiety type of headache, Dr. Stewart finds, starts shortly after the patient learns he has a high blood pressure. The sufferer may be beyond middle age and is commonly a woman. Bizarre complaints, such as "blackouts," "dizziness" and "weakness," often go with the headache. Patients say the headache is "perpetual," but suggestion that a given treatment will help may bring relief.

Where there is an "organic" headache

with high blood pressure, the headache is more like migraine except there is no "aura," or pre-headache visual symptoms. This organic headache with high blood pressure, like the anxiety one, is often "bad in the morning," and is made worse by worry. But where the anxiety one may be lessened by activity, the organic one is made worse by it.

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ANTHROPOLOGY

Teeth of "Missing Link" Resemble Those of Man

► FRESH EVIDENCE that the very human-like child's fossil skull found in a cave in South Africa was really human or the missing link between the ancestors of the apes and of man is presented in *Nature* (Aug. 8).

The place of this 'little "Taungs Baby" in man's family tree has been the subject of much discussion among anthropologists for years. Some have thought that the skull was that of one of the South African great apes. Others suggested that it might have belonged to an early Bushman. But the teeth were of great interest to scientists. Despite the fact that they were baby teeth, they already showed signs of wear in the typical human pattern.

Now two British mathematicians, Prof. J. Bronowski and W. M. Long, have applied a complicated mathematical technique to the problem. They studied four carefully chosen dimensions of eight baby canine teeth from the Taungs skull and from other Australopithecine remains found in South Africa.

The little fossil milk teeth, they found, are quite similar to one another. And, as a group, they are very similar to the milk canine teeth of modern European man. They are unlike those of modern anthropoid apes.

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ASTRONOMY

Discover New Comet In Southeastern Sky

► A NEW comet has been spotted in the constellation of Aquarius, the water carrier. It is of 15th magnitude, too faint to be picked up except by a powerful telescope.

The object, known as Comet Harrington after its discoverer, Robert G. Harrington of the California Institute of Technology, is moving very slowly southward. It was discovered as part of the sky survey being conducted by Palomar Observatory and the National Geographic Society. News of its discovery was bulletined to astronomers by Harvard College Observatory, clearing house for astronomical information in the Western Hemisphere.

This is the fifth new comet Mr. Harrington has spotted in the last two years.

Science News Letter, August 29, 1953

PHARMACOLOGY

Clue to Antibiotic Source

► THE STEADY tipling of marauding armies in the Mediterranean basin from Caesar to Napoleon has led a pharmacy student of the University of California to the discovery that wine may be a source of germ-killing antibiotics.

In addition to opening up a new possibility in the search for drugs, the work may throw new light on an important phase of human history during the past 2,000 years.

The student, John Gardner, received the Kilmer Prize, a national award for outstanding undergraduate research in a college of pharmacy, at the meeting of the American Pharmaceutical Association in Salt Lake City.

Mr. Gardner got his idea from several sources. He knew the people in the Mediterranean and Near East had always had a high rate of intestinal infection—typhoid, paratyphoid, dysentery, etc. While in the Navy serving in the area in World War II, he witnessed the high incidence of such infections among U. S. service personnel in spite of modern health measures.

A keen student of military history, he observed that Roman armies seemed to have been well protected against such diseases. Their relative handfuls, policing hostile

lands full of people loaded with intestinal infections, could not have stood heavy casualties from such diseases.

Mr. Gardner also noted that Roman soldiers drank wine under military orders. In one case the native wine of an area to be invaded was brought to Rome to condition invasion troops.

These things suggested to Mr. Gardner that wine might contain anti-bacterial substances which would protect against intestinal infections.

He put the idea to the test in his research, and came up with an agent which inhibits four representative species of bacteria—*escherichia coli*, *staphylococcus aureus*, *bacillus megatherium* and *pseudomonas aeruginosa*.

The inhibition is weak in comparison to penicillin. But the substance is still crude, and may gain strength with purification. The inhibition is in the test tube, and not yet in animals.

It is too early to say that anti-bacterial substances are present in wine in sufficient strength to have protected the Roman soldier from intestinal infection. It is also too early to say what antibiotics will be found in wine.

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PHARMACOLOGY

Unique Anti-Fungus Drug

► A UNIQUE drug is effective against serious systemic fungus infections, studies at the Los Angeles Veterans Administration Center and the University of California at Los Angeles Medical School have shown.

The new drug is called Nystatin. It is unique in that it is obtained from the pellicle formed by the growth of a mold rather than from cultural extracts as are other antibiotics. E. R. Squibb and Sons of New Brunswick, N. J., own the rights to the drug, which is not yet available commercially.

Biological cures of coccidioidomycosis in mice have been effected with Nystatin. The disease is ordinarily 100% fatal among the animals. The human disease, sometimes known as Valley Fever, has never responded to any drug and often results in a chronic lung condition similar to that of tuberculosis.

In some advanced cases among the mice biological cures were not effected, but in all the course of the disease was favorably altered by the drug. Clinical evaluations are now under way.

In recent years an increased need for fungicides has become apparent. In addition to such fungus diseases as Valley Fever, histoplasmosis, actinomycosis and blastomycosis, a new fungus problem has

arisen, which may have been created by widespread use of antibacterial drugs.

Conducting the research were Drs. Victor Newcomer, Edwin Wright, Alvin Leeb, Josephine Tarbet and Thomas Sternberg.

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PHOTOGRAPHY

Fast "Ortho" Film Serves Photographers

► A NEW sheet film has been developed that permits unusually short exposures, that gives strong tonal rendition and that can be retouched without special negative preparation.

Described at the meeting of the Photographer's Association of America in Chicago, the film is especially suited for portraits of men and children. It is an orthochromatic film, a type insensitive to red light. Because of this quality, the new High Speed Ortho brings out delicate colors in faces not worked over with make-up.

The film was developed by Du Pont Company scientists to meet the photographer's need for an ortho film that is "fast," that is, one which permits shorter exposures than present ortho films require.

Science News Letter, August 29, 1953

• RADIO

Saturday, Sept. 5, 1953, 3:15-3:30 p.m., EDT
"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Paul V. Smith, research chemist, chemical division, Standard Oil Development Co., Linden, N. J., will discuss "The Origin of Petroleum."

ENGINEERING

Heat Pump Developed For Mild-Winter Climates

► A NEW type of household air-conditioning-and-heating plant has been created for service in areas where winter temperatures are not extreme or of long duration.

Known as the heat pump, the electric device cools in the summer and heats in the winter. Westinghouse engineers of Hyde Park, Mass., who developed the machine, report it is more efficient than most air conditioning units, and that it is more than three times as efficient as other electrical heating plants in the winter.

Placed in the basement or utility room, the three-horsepower machine is housed in a cabinet that occupies 10 square feet of floor space and that stands six feet tall. The complete device weighs 1,400 pounds.

In operation the machine circulates filtered air through the house, dehumidifying and cooling the air in the summer, heating it in the winter. A special metering tube automatically switches the machine from air conditioning to heating service as the weather changes from summer to winter.

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SURGERY

Patients Cooled Down for Surgery, Then Rewarmed

► SURGEONS COOL down patients to slow their rate of living and allow direct operations on the heart with little interference by circulating blood. Then they warm them up again with electronic equipment devised for the purpose by the Canadian National Research Council in Ottawa.

In a Toronto General Hospital operation directed by Dr. W. G. Bigelow, special cooling blankets were used to drop the body temperature to 90 degrees Fahrenheit. Then surgery was performed on the heart while the blood did not interfere. The patient regained consciousness, and usual hospital procedures were resumed after diathermy and blanket heating, supervised by C. F. Pattenson and J. A. Hopps, of the National Research Council, brought the temperature to 94.5 degrees Fahrenheit in 40 minutes. For diathermy an 800-watt radiofrequency oscillator was used.

Rewarming methods are expected to be of use in the northern regions of Canada for use on frostbite and for resuscitation after exposure to severe cold.

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FIRST GROUND LAUNCHING PHOTO—The Ryan "Firebee" is shown as it is launched from a 60-foot rail with aid of a rocket to boost it to flying speed. A second or two after launching, the jet engine takes over as power source for the pilotless jet plane. (See SNL, Feb. 14, p. 101.)

PHYSICS

Glancing Nuclei React

► TWO ATOMIC hearts can have a mutual reaction even though they merely brush by each other.

This discovery at the Massachusetts Institute of Technology is believed by the scientists responsible to be the first experimental evidence that atomic nuclei can undergo reactions without actually being struck. Dr. Clark Goodman, associate professor of physics, and Clyde McClelland, research assistant, accelerated hydrogen nuclei or protons by one to two million volts in a Van de Graaff-type electrostatic generator.

These fast-moving protons, passing near, but not striking, the nuclei of any of several heavy elements, including tantalum and platinum, caused the heavy materials to give off high-energy X-rays, they report in *Physical Review* (Aug. 1).

The protons, Dr. Goodman explained, had such low energy that "they could never get near enough to do more than wave at the heavy metal nuclei." Yet they clearly produced high-energy X-rays, or gamma rays, which were measured and counted by a scintillation spectrometer.

"Putting this reaction on the same scale as our solar system," Dr. Goodman said, "it is as though a large meteorite, about half as big as the moon, whizzed by the earth at a distance of about 30,000 miles. The gravitational effect would create enormous wreckage on the earth's surface, even though our planet were never actually struck. In the same way, the electrical

effect of our fast-moving protons may be quite large though they never actually strike the nucleus."

These results, according to the M.I.T. workers, have been anticipated by the theoretical studies of several scientists, including Prof. E. Guth at the University of Notre Dame and Prof. Victor Weisskopf at M.I.T. The M.I.T. discovery has already been confirmed by scientists in Denmark, at Duke University, Durham, N.C., and the Canadian atomic energy laboratories at Chalk River, Ontario.

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TECHNOLOGY

Magnified Grease Spot Shows Internal Structure

See Front Cover

► AN UNUSUAL view of what makes our modern civilization roll is shown on the cover of this week's SCIENCE NEWS LETTER. It is a spot of grease, of less than a cross-section of human hair in size, as seen when magnified 20,000 times by Dr. R. T. Koenig of the Gulf Oil laboratories, Harmarville, Pa. The rope-like strands are soap crystals, which contribute to slipperiness by holding oil in the grease compound. The photo is one of a series in a study to develop more efficient greases.

Science News Letter, August 29, 1953

PHYSIOLOGY

Coffee Fragrance More Stimulating Than Onion

► COFFEE APPARENTLY has a more powerful smell than onions or camphor. At least, it causes a greater response on brain wave recordings.

Studies showing this were reported by Drs. Carl W. Sem-Jacobsen, Reginald G. Bickford, Henry W. Dodge, Jr., and Magnus C. Petersen of Rochester, Minn., at the Third International Congress of Electroencephalography and Clinical Neurophysiology in Cambridge, Mass.

Electroencephalography, known as EEG for short, is the science that deals with recording electrical activity accompanying nervous activity in the brain. Electroencephalograms, or brain wave records, are showing doctors many things about human brain activity.

The Rochester doctors took recordings from the region of the olfactory bulb, where the nerve of smell expands in the brain. The largest amplitude responses were obtained when the patient's olfactory bulb was stimulated by the smells of valerian, coffee, lilac perfume, cloves, benzene, peppermint, lavender and lemon. A moderate response came from smelling wintergreen, onion, turpentine, camphor and cinnamon. Room air, acetone and alcohol were almost without effect.

The response was apparently reduced, but not entirely abolished, when the patient was asleep. No characteristic frequency of brain waves, however, was found for any of the substances tested. So the doctors conclude that telling odors apart apparently is not done by a frequency sensitive nerve cell system.

Science News Letter, August 29, 1953

HORTICULTURE

Lily Bulb Storage Easier With Plastics

► LILY BULB growing, a million-dollar-a-year business, may be in for a boost, thanks to plastics.

Lily bulbs stored in cases lined with polyethylene sheeting stand storage conditions better and yield stronger plants with more blooms, reports Dr. Neil W. Stuart, physiologist of the U.S. Department of Agriculture.

Dr. Stuart's tests showed that for long storage of bulbs in plastic-lined cases, shredded-peat packing material can be left at about 50% of its total moisture capacity. In this way, the peat is prevented from drying out and the bulbs from rotting when the packing material is too wet.

Several varieties of Easter lilies, Dr. Stuart found, benefit particularly from the plastic-sheeting treatment, because of the long storage they require. For shorter storage, a higher percentage of moisture can be added to the plastic-lined cases.

Science News Letter, August 29, 1953

ORNITHOLOGY

High-Flying Bird Greeted Mt. Everest Conquerors

► THE CONQUERORS of Mount Everest, Sir Edmund Hillary and Tensing Norkay, had company near the crest of the mighty mountain—they saw an unidentified bird flying at a height of more than 27,000 feet.

This is something short of the record height at which birds have been seen flying, however. A flock of geese that were photographed near Dehra Dun, India, at 29,000 feet, are the high altitude champions so far.

The leader of the successful Mount Everest expedition, Sir John Hunt, reported that he saw two birds near their camp at about 26,000 feet altitude.

During a 1921 assault on Everest, Dr. A. F. R. Wollaston reported seeing a giant vulture, the lammergeier, at 24,000 to 25,000 feet altitude.

Other records: Godwits and curlews, 20,000 feet; Andean condor, over 19,000 feet; yellow-legs, black-bellied plovers and sand pipers, 10,000 to 12,000 feet; pelicans, ducks, geese and cranes, 3,000 to 8,000 feet.

Science News Letter, August 29, 1953

MEDICINE

Advise Late Testing In Nonparalytic Polio

► MUSCLE WEAKNESS may show up in more than a third of patients with nonparalytic polio quite some time after they have been discharged from the hospital with no sign of such weakness, Dr. Eugene Moskowitz of Mount Vernon, N.Y., and Dr. Lawrence I. Kaplan of New York City report in the *Journal of the American Medical Association* (Aug. 15).

Their findings were made in follow-up examinations of patients who had been treated at Grasslands Hospital, Valhalla, N.Y., and who were discharged from the hospital during the period 1947 to 1951.

The reason such muscle weakness is not detected before they leave the hospital, they explain, is that while at the hospital the patients, even if up out of bed, are not performing their normal daily play or job activities. Consequently, in the hospital there is no chance to determine whether a child's leg muscles will get weak and tired after two or three hours of active play, or a policeman's after an eight-hour shift.

A "surprising number," 42.7% of the patients, complained of getting tired more easily and many were irritable and easily upset, even to the point of stuttering. But the muscle weakness was not extensive enough in any of the 75 patients examined to interfere appreciably with their normal activities.

The diagnosis of nonparalytic poliomyelitis should be made only following complete muscle testing after the patient has resumed normal activity, the doctors advise.

If the patient is free of spasm and has had multiple screenings for muscle weakness, his stay in the hospital, in the average case, can be "significantly" reduced, they think.

Being allowed out of bed early has no bad effect on the nonparalytic polio patient's eventual functional recovery, if he does not have muscle spasm, breathing difficulty or fever.

Science News Letter, August 29, 1953

MEDICINE

Active Stomach Ulcer Is Bar to Air Travel

► THE VAST majority of sick people can travel by air, but there are some exceptions. These are reported by Dr. Sidney Kreinin of Swedish Hospital, Brooklyn, N.Y., in *GP*, the magazine of the American Academy of General Practice, as follows:

Patients with severe anemia, lung or chest difficulties, serious heart trouble, asthma patients subject to frequent attacks or during an acute attack, those with nose and throat and sinus infections, persons with stricture of the Eustachian tube between the ear and the throat, and those with active stomach ulcer.

The last are warned against flying because, as one ascends, gas in the stomach and intestine expands. Stomach ulcers might perforate under the stress of the rapidly expanding gas.

Babies travel well by air and seem less susceptible to air sickness than grown-ups, Dr. Kreinin states. He believes there is no reason women may not fly during pregnancy up to the last month before the baby is to be born.

Science News Letter, August 29, 1953

INVENTION

Antivesicant Chemicals Protection for Troops

► A MARYLAND inventor has developed new chemicals to combat the hazards of mustard gas and other vesicants. Jonathan W. Williams of Hyattsville reports that the chemicals can be impregnated in protective clothing for troops that must enter a contaminated area.

As vesicant fumes work inside the suit with the air that cools the soldier's body, the chemicals effectively neutralize the vesicant so that the soldier is not burned.

Such antivesicant chemicals must not be harmful to the skin, and they should be stable to oxygen, water and sunlight. They must cause little or no increase in flammability or deterioration of the cloth and they must withstand laundering.

Although many compounds containing reactive chlorine meet some of these specifications, Mr. Williams says his chemicals, described as tetrachloro disubstituted glycolurils, do a better all-around job. His patent is No. 2,649,389.

Science News Letter, August 29, 1953

IN SCIENCE

CHEMISTRY

Zirconium Dioxide Stabilized for Jets

► SCIENTISTS HAVE learned to stabilize a white powder that may make better jet engines and rockets possible in the future.

The powder is zirconium dioxide, a material whose crystals frequently change when attacked by heat. Changes in the crystals often cause a structural failure of the material.

By using special additives, ceramic research scientists at the Air Force's Wright Air Development Center, Dayton, Ohio, have been able to produce zirconium dioxide that can withstand heat up to 4,000 degrees Fahrenheit.

This may make possible better combustion-chamber liners for ram jet and rocket engines, as well as better engine nozzles. These parts are subjected to searing heat in rocket and jet engines. The powder also may be used in turbine blading some day.

The stabilization process can be done at lower temperatures than heretofore known. The technique should permit workers to use new fabrication methods that will help cut manufacturing costs.

Science News Letter, August 29, 1953

MEDICINE

New Technique Provides Better X-Ray of Spine

► A NEW X-ray technique to locate slipped disks, spinal cancers and other ailments of the back has been developed by West Los Angeles Veterans Administration and University of California at Los Angeles doctors.

It is faster and less irritating to the patient than conventional X-ray methods.

This is how it works: Radioactive iodinated human serum albumin is injected into the spine. A sensitive radiation detector known as a scintillation counter traces the radioactive substance through the spinal column, activating an electronic stylus which makes a sketch of the spine.

The iodinated human serum albumin is harmless in contrast to the irritation often caused by iodized oils used in spinal X-rays. Discomfort to the patient is reduced since the albumin does not have to be removed from the spine as does the oil.

The area being examined is visible during the procedure so that if a technical error should occur, it is evident immediately. In taking an X-ray, the error is only apparent after film has been developed.

The new technique was developed by Drs. Franz K. Bauer and Eric T. Yuhl.

Science News Letter, August 29, 1953

ENIE FIELDS

TECHNOLOGY

Human Hearts Studied With 3-D Apparatus

► WHILE COMMERCIAL moving picture producers were working to perfect 3-D, medical men at the University of Mississippi have been using 3-D to study the human heart.

For the past three years, Dr. Arthur C. Guyton, chairman of the department of physiology and biophysics, and his associate, Jack Crowell, have been operating a 3-D apparatus called the "stereovectorcardiograph." Use of the electrocardiograph with uniplane recordings has been common for many years, but making of three-dimensional vectorcardiograms is something new. The only other 3-D device similar to this is that used by Dr. O. H. Schmitt at the Mayo Clinic.

The stereovectorcardiograph, designed in the University of Mississippi laboratory, utilizes a five-inch, cathode-ray tube which has two separate beams. One of these plays on the left side of the screen; the other on the right. It is so simplified that clinicians can make stereovectorcardiograms which depict three-dimensional vectorcardiograms almost as easily as they now make recordings on a single plane.

They obtain the third-dimensional effect either by direct observation of the images on the oscillograph screen or by photographing the images first. Using a Polaroid-Land camera, Dr. Guyton can develop and make positive prints in a minute's time.

Science News Letter, August 29, 1953

ECOLOGY

Just Trace of Chemical Multiplies Sheep to Acre

► AUSTRALIAN SOIL experts have come up with a way to graze from two to 40 times as many sheep per acre as are presently grazed in certain areas with good rainfall in Australia. In some cases this can be done simply by adding up to an ounce of molybdenum to each acre of pasture.

This discovery means that millions of acres of now almost unutilized Australian territory will be open to agricultural exploitation. A. F. Gurnett-Smith, agricultural adviser to the Australian Scientific Liaison Office in Washington, explained that this is the result of study of the role of "trace elements" in the soil—minute quantities of, for instance, zinc, copper, sulfur and molybdenum.

The lack of certain of these trace elements causes land to be unproductive, as has been known to agriculturalists a long

time. Australia, with her soils worn out in many places by geologic old age, offered ample grounds for pioneering in trace-elements research. In the U. S., by contrast, it has turned out that most of the soil does not require the addition of molybdenum or even other trace elements, since it already contains the necessary amounts.

Some 340,000,000 acres of unimproved land, Dr. J. Griffiths Davies, associate chief of Australia's Division of Plant Industry, Melbourne, estimates, can be converted, wherever the Australian climate permits, into lush grazing ground.

Having found, after some 15 years of research, which elements and how much of each are needed for different soils, the Australians now know that in the Southern Tablelands of New South Wales, for instance, small amounts of phosphorus, sulfur, calcium and molybdenum will enable some millions of acres to feed three sheep per acre. This contrasts to the previous ratio of one sheep to two acres.

In the southeast of South Australia, the addition of superphosphate, copper and zinc, it is found, changes the ratio from one sheep to 20 acres to two sheep per acre.

Such remarkable changes are forecast for areas where the rainfall is adequate. In the great deserts of central Australia, extreme aridity continues to defy agricultural development.

Science News Letter, August 29, 1953

SEISMOLOGY

Aftershocks Come When Earth Creeps Back

► AFTERSHOCKS THAT follow earthquakes, such as those which hit the Ionian Islands off Greece, are caused by the earth creeping back into place after the "snap" of the quake.

After a tremor, the earth is something like a stretched plastic belt crawling back to a stable state again.

The "snap" of a quake may not come until years after the stresses and strains that cause it have started to build up. During this time, warping occurs. Then after the release of these tensions by the sudden shock of an earthquake, the earth slowly creeps back into approximately the state it had been prior to the quake. This creeping, which brings the aftershocks, may continue for many months after a quake.

Although the explanation of why we have earthquakes is relatively simple, predicting when and where they will strike cannot be done with any accuracy.

The solid rocky crust of the earth is always in a state of strain and is acted upon by shifting forces. When the rocks shift a little to relieve the strain, they cause an earthquake. The waves set up by this earthquake in the rocky material of the earth's crust spread out like ripples from a stone in a pond, and are detected on delicately balanced seismographs half way round the world.

Science News Letter, August 29, 1953

GEOCHEMISTRY

Lead Shows Earth Age 3,500,000,000 Years

► A CHEMICAL closely related to the tetraethyl lead in high-test gasoline has been used by scientists to show the age of the earth's crust as 3,500,000,000 years. They have also found that the earliest time at which all the elements could have been formed was 5,500,000,000 years ago.

Lead tetramethyl was the chemical with which Drs. C. B. Collins, R. D. Russell and R. M. Farquhar of the University of Toronto worked. The lead for this compound came from especially selected uranium minerals, they report in the *Canadian Journal of Physics* (March).

All uranium and thorium minerals are radioactive, and decay over a long period of time to lead. This "radiogenic" lead looks and reacts like ordinary lead, and is found mixed with ordinary lead in minerals.

It is, however, an isotope of ordinary lead. Since it results from the radioactive decay of uranium and thorium minerals, the amount of the isotope is an indicator of the mineral's age.

To detect the amount of radiogenic lead in minerals, the three Canadian scientists made it into lead tetramethyl, then analyzed the compound in a mass spectrograph. They did this for many samples from all over the world to get the time of formation of the earth's crust and the maximum time of formation of the elements.

Science News Letter, August 29, 1953

INVENTION

Remote Control Bombing Done With Glider and TV

► U. S. AIR Force pilots now can foist "suicide" bombing upon any enemy without having to sacrifice their lives.

An "apparatus for remote control bombing," patented by Delmer S. Fahrney of the U. S. Navy, permits death-laden gliders to be towed near the target, released and guided by remote control to the bull's eye.

The scheme permits fighter planes to carry out bombing missions by towing small suicide bombers to the enemy. When in range, the pilot cuts the glider free. A television camera nestled in the glider's nose flashes pictures to the fighter pilot showing what is ahead of the glider. By watching his tiny TV screen, the pilot can guide the glider to an enemy ship or ammunition dump by radio control.

The fighter pilot can trigger the glider's bomb load by remote control, or he can leave the detonation up to an impact switch built into the glider.

The remote control bombing system was granted patent No. 2,649,262 under Section 266 of the Patent Laws, which permits the government to use the invention without payment of royalties to the inventor.

Science News Letter, August 29, 1953

ASTRONOMY

See Planets Early or Late

Autumn constellations now beginning to shine, even though fall does not start officially until Sept. 23, early in the morning after the night of harvest moon.

By JAMES STOKLEY

► IN ORDER to see planets during the month of September, one has to look either early or late.

However, the constellations of autumn are now beginning to appear, and are shown on the accompanying maps. These show the heavens as they look about ten p.m. your own kind of standard time, at the beginning of September, and an hour earlier at the middle of the month. (Add one hour if you are on daylight time.)

The stars and constellations of the evening skies are now assuming a typically autumnal appearance, even though autumn does not commence officially until the early morning of Sept. 23.

The brightest star now visible is Vega, in Lyra, the lyre, which is high in the west, nearly overhead. Almost at the zenith is Deneb, in Cygnus, the swan, and a little lower, to the south, is Altair, in Aquila, the eagle.

Three other stars of the first magnitude are indicated, but all are so near the horizon that they are somewhat dimmed. Low in the south is the constellation of Piscis Austrinus, the southern fish, in which first-magnitude Fomalhaut can be seen. Arc-turus, in Bootes, the herdsman, is low in the west.

During spring and summer evenings, it was a conspicuous object, high in the sky, and this is its last appearance on our maps until next March.

Capella Now Reappearing

Near the northeastern horizon, on the other hand, is a star that is now reappearing after having been gone for recent months. This is Capella, in Auriga, the charioteer. On winter evenings it stands high in the sky, as one of the brilliant array surrounding Orion, so when we see it, we know that summer indeed is practically past.

As for the planets, Saturn may be glimpsed low in the west just after evening darkness begins to fall, especially at the beginning of September, in the constellation of Virgo, the virgin. At that time it sets nearly two hours after the sun, about the time twilight is ending. Later in September it follows even sooner after the sun, and will not easily be seen.

About midnight Jupiter appears in the east, in Taurus, the bull. Since it is far brighter than any star in the region, it will be easy to locate. It remains visible the rest of the night. Still later, about three

hours before sunrise, Venus rises, even more brilliant than Jupiter, in the constellation of Cancer, the crab. Again, its great brilliance makes it easy to identify.

Then about two hours before the sun, Mars appears, in Leo, the lion. It stands close to the star called Regulus. However, it is considerably fainter, of the second magnitude, so it will not be a conspicuous object.

Autumn Official Sept. 23

The beginning of autumn, in the Northern Hemisphere at least, is usually considered to come with the autumnal equinox. This is the time at which the sun reaches the midpoint of the southward journey in the sky it began on June 21. At that time —3:07 a.m., EST on Sept. 23—it stands directly over the equator.

As the sun moves southward it gets continually lower and lower for those of us who live in northern countries, but for people south of the equator it is now getting higher. Thus, for them, the event that occurs on the 23rd is the beginning of spring rather than of autumn.

On the night of Sept. 22, during which this event occurs, the moon is full. The full moon nearest the equinox, and it could not be much nearer than it is this month, is called the harvest moon. Actually, the significance of this particular full moon is found in the fact that for several nights the time of moonrise changes very little.

On the 23rd, for example, at 40 degrees north latitude, it rises only 29 minutes later than it did on the 22nd, while moonrise on the 24th is 31 minutes later than on the 23rd. We may contrast this with the full moon of last March 30, soon after the be-

ginning of spring. Then an hour or more elapsed between moonrise on successive nights.

The reason for this is found in the changing angle made with the horizon by the ecliptic, the path along which the moon, and the sun as well, seem to move through the sky. In March it makes a very steep angle, and as the moon moves along, it very rapidly gets lower and lower, thus causing the maximum delay in rising from one night to the next.

In September, however, the ecliptic is much more nearly parallel to the horizon. Even though the moon may move along it the same distance from day to day as it did last March, this movement does not take it so far out of sight. Since it is the distance that it moves with respect to the horizon that determines the change in rising time, we now have the least difference.

Bright, Moonlight Nights

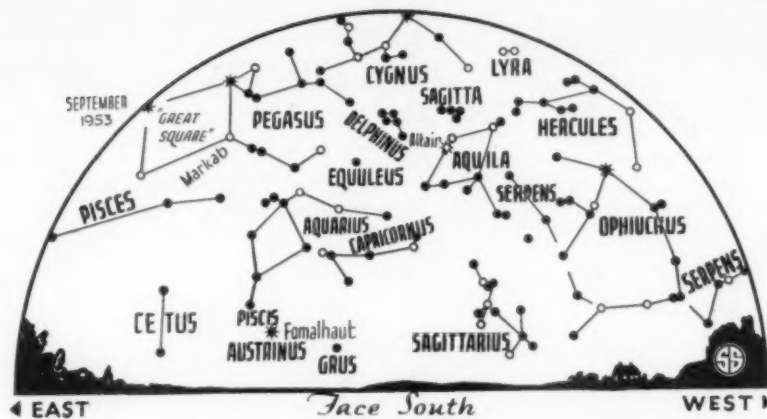
For several nights, we have lots of bright moonlight, which is supposed to help the farmer work into the night gathering his harvest. Hence it is called the harvest moon.

The moon's average distance from earth is about 239,000 miles, but each month it approaches as close as 225,000 miles, or even less, and then recedes to a distance of more than 250,000 miles. The close approach is called "perigee," and the distant position "apogee."

The latter occurs on Sept. 9, the distance being 252,600 miles. Perigee, it happens, comes at just about the time of full moon, and the distance is 221,700 miles.

All this has an important bearing on the height of the tides. As is well-known, this ebb and flow of the oceans is caused by the gravitational attraction of the sun and the moon, principally the latter. When the moon is new, it is in the same direction from earth as the sun; when it is full, it is in the opposite direction.





★ ★ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

In either position all three bodies, earth, moon and sun, are in line, and the pull of the first two on the oceans is a maximum. At first or last quarter, the moon and sun are in directions at right angles, and the high tide from the sun coincides with the low tide from the moon, partially counteracting it. Thus, at new and full moon we have the "spring" tides, when there is the greatest difference between high and low. The "neap" tides, which occur at first and last quarter, have the least range.

Moon's Distance Important

Also, the distance of the moon has an important effect. When nearest, as on Sept. 22, it produces the greatest tidal effect, and if this happens, as it does then, to coincide with full moon, we have the highest tides of all. This is demonstrated by reference to tide tables for New York, as a typical example. Shortly after this coincidence of full moon and perigee, on Sept. 24, high tide at The Battery, at 8:45 a.m., will be 6.7 feet higher than the low tides before and after.

Back in February, when apogee came on the same day as full moon, the 28th, the subsequent spring tides showed a range of less than five feet between high and low. This is not much above the average tidal range at New York for all tides, which is slightly less than 4.5 feet.

Some of the smallest range of the year came about May 22, with a high only 2.6 feet above the preceding low. Then the moon was farthest the day after it was in the first quarter phase.

Celestial Time Table for September

Sept.	EST	
1	10:50 a.m.	Moon passes Jupiter.
4	10:23 p.m.	Moon passes Venus.
6	11:51 a.m.	Moon passes Mars.
8	2:47 a.m.	New moon.
9	11:00 a.m.	Moon farthest, distance 252,600 miles.
11	5:25 p.m.	Moon passes Saturn.
16	4:49 a.m.	Moon in first quarter.
22	11:00 p.m.	Moon nearest, distance 221,700 miles.
	11:15 p.m.	Full moon ("harvest moon").

23 3:07 a.m. Sun over equator — autumnal equinox (autumn commences in northern hemisphere).

28 9:56 p.m. Moon passes Jupiter.

29 4:51 p.m. Moon in last quarter.

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GEOPHYSICS

Earth's Iron Heart Both Molten and Solid

➤ A SOLID inner core of iron is at the earth's center surrounded by the same metal in a molten state.

This is shown by new studies by Dr. J. A. Jacobs of the University of Toronto, Canada, reported in *Nature* (Aug. 15).

In the beginning the earth was completely molten. Now there is a layer of liquid metal that lies between the crust and a solid center. A mantle of rocky material extends to the surface. Below it, there is a region still so hot and under such pressure that it is liquid. At the center there is solid iron.

Solidification of the earth did not begin at the boundary of the iron core and the outside crust of rocky silicates. Instead, Dr. Jacobs' analysis shows that the iron began to become solid at the very center of the earth. This solid inner core continued to grow until the temperature at which loss and gain of heat was equaled—the adiabatic temperature—was the same as the melting point of the iron.

As the earth cooled still further, the rocky layers on the outside solidified, not from the top or surface of the earth, but at the bottom junction between the mantle and the iron core.

Thus, a liquid layer of iron was trapped essentially at its original temperature, insulated above by a rapidly thickening shell of silicates, and below by an already solid iron inner core.

Earthquake waves had indicated previously that at least part of the core of the earth is liquid because no transverse waves pass through the center of the earth. The inner solid iron core begins at a depth of approximately 5,000 kilometers (3,100 miles).

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HOW TO RETIRE SOONER

by earning a small income

Government figures prove you need much less money if you retire to the country, and now a new book shows over and over again how to make the money you do need, whether you retire with or without a lot of money in the bank.

Fred Tyler's **HOW TO MAKE A LIVING IN THE COUNTRY** is "virtually a blue print for the retired man or woman wanting to make their own way," says the Chicago Daily News.

With this book, you learn:

- how to make the most income from tourist cabins and a trailer camp (including where to locate for the most business at highest rentals);
- what to do to earn \$3000 a year from a week end roadstand (even if you never raise a green thing);
- how 500 chickens will bring you a fine living on your own bit of land;
- the best way known to learn which business to start;
- the only sure way to get a good buy in a business put up for sale;
- how a \$2500 investment in a part-time business will bring you all the income a retired family may need in the country;
- the dozens and dozens of other dignified, easy to start part-time enterprises that pay well in the country (from renting out equipment for week end farming to dozens of other profitable ideas).

Read this 75,000 word book now. Check off the ways you'd like to earn a small income in the country. See how easily they make retirement possible for you —now. Despite its big size, **HOW TO MAKE A LIVING IN THE COUNTRY** costs only \$1. Money back, of course, if not satisfied.

For your copy, simply send this ad with your name and address and \$1 bill to **HARIAN PUBLICATIONS, 36 SECOND AVE., GREENLAWN (LONG ISLAND), NEW YORK.**

Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

AGE AND ACHIEVEMENT—Harvey C. Lehman—*Princeton University Press*, 359 p., \$7.50. A creative thinker such as a scientist generally continues to produce during most of his life, but his later published work is likely to be much less epoch-making than are the works produced from age 25 to 45. There is such a thing, Dr. Lehman concludes, however, as creative teaching and scientists may make their later contributions through their students.

THE AMAZONIAN CORAL SNAKE—Karl P. Schmidt—*Chicago Natural History Museum*, 10 p., illus., paper, 25 cents. The great size reached by individuals of this species and the boldness of its pattern give it an impressive appearance.

AMERICAN SCHOOL OF PREHISTORIC RESEARCH BULLETIN 17, 1953: Dedicated to the Memory of George Grant MacCurdy—Hugh Hencken, Ed.—*Peabody Museum*, 71 p., illus., paper, \$2.45. This publication contains the following articles: An appreciation of the School's founder, a report on a further reconstruction of one of the best preserved Neanderthaloid skeletons from Mount Carmel, and a critical digest of the Russian report on a Palaeolithic site.

BETWEEN THE TIDES—Philip Street—*Philosophical Library*, 175 p., illus., \$4.75. Intended for the young naturalist, this introduces him to the rich variety of life on the seashore.

BEHAVIOR OF THE LIZARD CORYTHOPHANES CRISTATUS—D. Dwight Davis—*Chicago Natural History Museum*, 8 p., illus., paper, 30 cents. This lizard has a way of "freezing" in whatever position it is placed and remaining motionless for minutes on end. It also increases the apparent size of the head and throat when face to face with a snake.

CHILDHOOD'S END—Arthur C. Clarke—*Ballantine*, 214 p., paper 35 cents, cloth \$2.00. A science fiction story of how the strife between men of different ideologies becomes meaningless when the space ships of the "Overlords" suddenly appear over all major cities of the earth.

A COLUMBIAN RACE OF TINAMUS OSGOODI—Emmet R. Blake—*Chicago Natural History Museum*, 2 p., paper, 15 cents. A strikingly distinct species of game bird.

THE ELAPID GENUS OF SNAKES WALTERINNESIA—Hymen Marx—*Chicago Natural History Museum*, 8 p., illus., paper, 20 cents. Description of a rare cobra.

ELEMENTARY MATHEMATICS FROM AN ADVANCED STANDPOINT: Arithmetic, Algebra, Analysis—Felix Klein—*Dover*, 274 p., paper \$1.50, cloth \$3.25. Teaching high school and college mathematics.

F. T. PALGRAVE'S THE GOLDEN TREASURY OF THE BEST SONGS AND LYRICAL POEMS: A Modern Edition—Oscar Williams—*New American Library*, 532 p., paper, 50 cents. In adding modern poems to this famous collection, Palgrave's main intention of presenting the finest lyrical expression of the English language was kept in view.

HEALTH PRINCIPLES AND PRACTICE—C. V. Langton and C. L. Anderson—*Mosby*, 417 p., illus., \$4.25. Emphasis is upon the basic principles of health promotion. Physiology and biology are treated only secondarily when necessary for understanding.

HEMPRICH'S CORAL SNAKE MICRURUS HEMPRICHI—Karl P. Schmidt—*Chicago Natural History Museum*, 6 p., illus., paper, 15 cents. One of the least known of the coral snakes which has now been found sparingly in Ecuador and Peru.

INSECTS: Their Secret World—Evelyn Cheesman—*Sloane*, 246 p., illus., \$3.50. An entertaining book about familiar and strange insects and their extraordinary talents for survival. Also the strange lengths to which some flowers go to trap insects.

LANGUAGE, TRUTH AND LOGIC—Alfred Jules Ayer—*Dover*, 160 p., paper \$1.25, cloth \$2.50. Intended as an antidote to fuzzy writing and muddled thinking.

MOLLUSKS FROM ILHA GRANDE, RIO DE JANEIRO, BRAZIL—Fritz Haas—*Chicago Natural History Museum*, 7 p., illus., paper, 25 cents. This island is an isolated, and hence little explored, spot on the east coast of Brazil.

A NEW FISH FROM NORTH BORNEO GENUS TETRAODON—Robert F. Inger—*Chicago Natural History Museum*, 4 p., illus., paper, 15 cents. This fish is without scales, but it has erectile spines and one large tooth in each half of both jaws.

A NEW FROG FROM PANAMA—Harold Trapido—*Chicago Natural History Museum*, 7 p., illus., paper, 20 cents. Description of a frog collected while studying the canopy mosquito fauna of a tropical rain forest in Panama.

A NEW FRUIT PIGEON FROM NEPAL—Austin L. Rand and Robert L. Fleming—*Chicago Natural History Museum*, 2 p., paper, 15 cents.

A NEW WORM SNAKE FROM COLOMBIA GENUS ANOMALEPIBIS—Hymen Marx—*Chicago Natural History Museum*, 2 p., paper, 15 cents.

PETS: A Complete Handbook on the Care, Understanding and Appreciation of All Kinds of Animal Pets—Frances N. Christy—*Little, Brown*, 272 p., illus., \$3.50. Showing children how to have fun with a pet, and how to make it happy, too, and healthy.

THE PLEISTOCENE FAUNA OF WAILES BLUFF AND LANGLEYS BLUFF, MARYLAND—S. F. Blake—*Smithsonian*, Miscellaneous collections volume 121, number 12, 32 p., illus., paper, 40 cents. Wailes Bluff is the most important Pleistocene locality in Maryland. At one time it was considered the youngest Pleistocene formation in the state, but is now thought to be older.

PROBLEM BOOK IN THE THEORY OF FUNCTIONS: Volume I, Problems in the Elementary Theory of Functions—Konrad Knopp—*Dover*, 126 p., paper \$1.25, cloth \$2.50. Problems arranged according to increasing difficulty.

PROBLEM BOOK IN THE THEORY OF FUNCTIONS: Volume II, Problems in the Advanced Theory of Functions—Konrad Knopp—*Dover*, 138 p., paper \$1.25, cloth \$2.25.

SOLAR VARIATION, A LEADING WEATHER ELEMENT—C. G. Abbot—*Smithsonian*, 35 p., illus., paper, 40 cents. The author holds that statistically derived results may be accepted if supported by observations, even though no theory is available to explain them. He cites evidence and arguments in favor of his hypothesis.

SUBSTANCE AND FUNCTION AND EINSTEIN'S THEORY OF RELATIVITY—Ernst Cassirer—*Dover*, 465 p., both books bound as one, paper \$1.95, cloth \$3.95. This is one of the series of scientific books which *Dover* publishes in exactly the same form but in an inexpensive paper binding for students.

SUCCULENT PLANTS: Other Than Cacti—A. Bertrand—*Philosophical Library*, 112 p., illus., \$4.75. A study limited to those plants which are of horticultural interest, either by reason of their beauty or their extraordinary appearance, and which are common in cultivation. Beautifully illustrated.

THE TSUNAMI OF NOVEMBER 4, 1952 AS RECORDED AT TIDE STATIONS—W. B. Zerbe—*Govt. Printing Office*, 62 p., illus., paper, 35 cents. A factual record as shown by tide gage records and other data. Actual tide gage records from various parts of the world are included.

TWENTY-FIVE YEARS OF SEX RESEARCH: History of the National Research Council Committee for Research in Problems of Sex—Sophie D. Aberle and George W. Corner—*Saunders*, 248 p., paper, \$4.00. It may surprise young people to learn that, when this committee was organized in 1921, it was first necessary to establish and defend the importance and the dignity of such studies.

UNESCO SCIENCE COOPERATION OFFICE FOR LATIN AMERICA REPORT OF ACTIVITIES DURING 1952—A. Establier—*UNESCO Relations Staff, Department of State*, 16 p., paper, free upon request direct to publisher, Washington 25, D. C. Reporting on symposia, plans for establishing international and regional laboratories, regional training courses in scientific research, and techniques for the dissemination of science.

U. S. CITIZENS IN WORLD AFFAIRS: A Directory of Non-Governmental Organizations: Who They Are and What They Do—Katherine C. Garrigue, Ed.—*Foreign Policy Association*, 389 p., paper \$3.00, cloth \$5.00. An alphabetical list of societies of international scope with their officers, purposes and publications.

A VISIT TO KAREWA ISLAND, HOME OF THE TUATARA—Karl P. Schmidt—*Chicago Natural History Museum*, 12 p., illus., paper, 25 cents. The tuatara is described by the author as a "relict of relicts" whose Triassic relatives are as ancient as the turtle group, and which survives only on the offshore islets of New Zealand.

Science News Letter, August 29, 1953

Wings of a modern jet bomber look almost thin, yet they weigh 18 tons; the wing-skin before shaping is as thick as the hull of a destroyer.

Some day the shape and size of olive trees may be changed so that the fruit can be harvested from the ground.

GEOPHYSICS

New Sunspot Cycle

► THE FIRST spot of a new solar cycle has been spotted high on the sun's face.

The McMath-Hulbert Observatory of the University of Michigan has informed radio experts at the National Bureau of Standards that a small, hard and dark disturbance appeared at latitude 52 degrees north and 12 degrees east on Aug. 13. Dr. Helen Dodson and Clifford Bennett discovered this addition to the sun's activity.

Most of the spots up to now have been near the sun's equator at about 5 to 10 degrees north latitude. Sunspot activity is now approaching a minimum and the least sun spottedness will be reached in less than a year. The whole cycle of the sun's activ-

ity takes about 10 to 11 years. At the same time of the appearance of this high latitude spot, four other sunspots, in low latitudes and belonging to the old cycle of solar activity, were also visible on the surface of the sun.

The last maximum was the middle of 1947 and the one before that was 1937-38. The best guess of the next maximum is the middle of 1958.

Sunspots affect the transmission of radio here on earth and the government scientists use them in making day-by-day predictions of use to communications and the armed forces.

Science News Letter, August 29, 1953

METEOROLOGY

Predict Severe Drought

► THE DROUGHT in the Southwest in 1976 will probably be worse and longer than the one this year, Dr. Charles G. Abbot, retired secretary of the Smithsonian Institution, predicts.

He bases this forecast on periodic variations in the heat of the sun that he has found by studying the relations between solar changes and the weather. These variations complete one cycle in 22 and three-fourth years, Dr. Abbot reports in "Solar Variation, A Leading Weather Element" (see p. 140).

Therefore, on the whole, this year's weather will repeat its same general trends in 1976. This means, for instance, a drier than normal spring and summer in the Southwest.

Besides the 22 and three-quarter year cycle, Dr. Abbot has been able to find 23 subcycles that can be used to forecast the weather. He says that his system, at the present time, is useful only for broad, general predictions, not for rain tomorrow afternoon.

Many meteorologists believe that changes in the amount of heat received by the earth from the sun affect the weather. Some of them, however, doubt that this variation can have as much effect on the weather as Dr. Abbot believes it has, since the changes found are only about three percent.

The base measure in Dr. Abbot's calculations is the solar constant, which Smithsonian scientists have been measuring nearly every day for 35 years. The solar constant is a measure of the amount of heat given off by the sun, and it averages 1.94 calories per square centimeter per minute. In analyzing changes in the solar constant, Dr. Abbot found that they were not haphazard, but followed many separate rhythm patterns, or cycles, at the same time.

There are many factors that prevent a direct correlation between changes in the solar heat and the probability of light

showers on any particular afternoon. Some of these factors are the earth's motion, mountains and the smoke-belching cities of man.

Science News Letter, August 29, 1953

VETERINARY MEDICINE

Parrot Fever Discovered In Turkeys for First Time

► PSITTACOSIS, OR parrot fever, has been definitely found in turkeys for the first time. Drs. Karl F. Meyer and Bernice Eddie of the University of California have isolated the virus of psittacosis from turkeys in Texas.

The possibility that turkeys might carry the virus has been suspected since 1941 when the same scientists first isolated the disease agent from barnyard fowl, at that time in chickens.

A chance to prove turkeys could carry the virus came with an outbreak in Texas last year of psittacosis among employees of poultry-dressing plants, in which there were 63 cases with four deaths. By backtracking, the scientists found the source of the epidemic to be turkeys from farms supplying the plants. The turkey virus was found to have great virulence and infectivity.

Psittacosis attacks the lungs, and often causes severe pneumonia and sometimes death. In less severe cases, it may act like a bad bout of influenza or a cold. It often goes undiagnosed.

Nowadays, aureomycin controls psittacosis effectively if a proper diagnosis is made in time. But diagnosis remains difficult, recovery is often slow, and so the disease remains dangerous.

The scientists have found psittacosis in pigeons, ducks and other fowl, in addition to the better known reservoir of parakeets.

Science News Letter, August 29, 1953

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A Successful Family

► SUMMER, ESPECIALLY late summer, is the high burgeoning time for that great family of flowering plants that face the sun with myriad small images of himself, the Compositae.

Sunflowers—half a hundred species of them—daisies, asters, goldenrods, compass-plants, coneflowers, blazing-stars, thistles, dandelions and scores of other bright flower-heads shine boldly back at the summer sky's own colors, gold and blue.

If numbers of species and variety of forms are criteria of success in the plant world, this is the most successful of all plant families. There are well over 13,000 described species, distributed among a couple of hundred genera. Members of the family flourish from the polar regions to the tropics, from swamps to deserts, from sea level to high alpine meadows.

Most of them are of non-woody, herbaceous habit; a moderate number are shrubs. Very few of the composites can be classified as trees, and these are only small trees, growing in restricted and mostly out-of-the-way parts of the earth. This predominance of the herbaceous habit of growth is again evidence of a high degree of evolution, in the opinion of many botanists.

The flower structure of a composite is baffling to all beginning students of plant life. Equipped with the basal knowledge

of the "typical" flower's parts—sepals, petals, stamens and pistil—they are left floundering the first time they dissect a dandelion or a daisy.

The secret is that a flower of a member of the composite family is exactly what the name implies: a composite structure. It isn't a single, simple flower, but a whole society of flowers, quite small ones, crowded closely side by side. The Compositae are among plants what bees, ants and termites are among insects—societies rather than individuals.

If you will split up one of these flower heads, you will find that the unit of floral structure is a small seed-forming body or pistil, made angular through crowding, that sits tight on a flat or convex base, the receptacle. It is very likely to have five stamens packed into a close ring. There may be no petals at all, but if petals are present they form a one-sided, strap-like affair, as in dandelions or thistles. A trace of the original five-petaled structure may be seen in five points at the outer ends of this strap.

In many composite flower heads, most of the tiny flowers (florets, to be learned about it) have lost the strap-like corolla and are crowded together in a central disk. A row of florets around the margin produce much-enlarged petaloid structures, usually called rays. This arrangement is typical of such plants as sunflowers, coneflowers and daisies.

Often the ray-florets are sterile, producing no seed; their job is to entice insects to their unpetaled but fertile sister florets of the disk—a division of labor again suggesting the cooperative life of the beehive or the anthill.

Science News Letter, August 29, 1953

GENERAL SCIENCE

Research on Sex Aided

► GRANTS FROM the National Research Council's committee for research in problems of sex have gone to more than a hundred scientists besides Dr. Alfred C. Kinsey of Indiana University, noted for his studies of sexual behavior in human males and females.

Some of the research supported by the committee in the first 25 years of its existence led, among other things, to isolation of the arthritis remedy, ACTH. The use of sex hormones for treatment of cancer of the prostate gland developed from studies by Dr. Charles Huggins of the University of Chicago which were supported for years, in part, by this committee.

The committee was organized in 1921 "because a group of responsible American philanthropists, physicians and scientists felt an urgent demand for study of human sex behavior with all the resources of modern science. Faced with growing national concern about sex problems in the community, they realized that the need for social, educational and medical information was greater than current science could supply."

PHYSIOLOGY

Brain Wave Records Aided in Treatment

► BRAIN WAVE records, or EEG's, short for electroencephalograms, helped Naval medical officers treat men who got acute head injuries during the Korean fighting, four doctors reported at the Third International Congress of Electroencephalography and Clinical Neurophysiology in Boston.

The four doctors are Dr. William F. Caveness, now at the Neurological Institute of New York City, Dr. James C. Luce, Medford, Ore., Dr. Wilford A. Risteen, University of Georgia at Athens, and Capt. George N. Raines, now executive officer at the Naval Hospital at Portsmouth, Va.

In treating combat head injuries, the doctors had to consider both the structural damage to skull and brain and the damage to brain functioning. Brain functioning could be measured objectively with the EEG's. Taken shortly after the man was wounded, in some cases within an hour and a half, and at later periods during his hospital stay, the EEG helped doctors estimate the extent of injury, the effectiveness of treatment and forecast the rate of recovery.

Because the machine for taking electroencephalograms is very sensitive, the Navy has special buildings for them at its medical installations. There was some fear that they could not be used aboard ship. Fortunately, it turned out that this fear was groundless, and EEG's could be taken of wounded sailors and marines on the Navy's hospital ships as well as ashore.

Science News Letter, August 29, 1953

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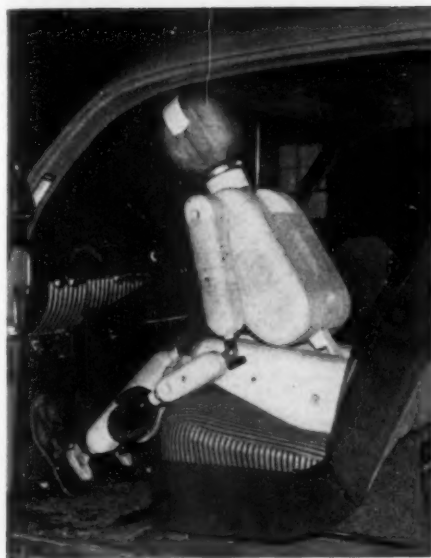
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TECHNOLOGY

Brain Waves and Movies

► A PRACTICAL device for getting a brain wave record and moving picture of a patient on the same film was announced by Drs. Robert S. Schwab, Mack W. Schwab, Donald Withee and Young Chew Chock of Boston at the Third International Congress of Electroencephalography and Clinical Neurology in Boston.

With both brain wave record and movie of the patient on the same film, doctors can study the relation "of electrical events and bodily movements," the doctors pointed out.

The difficulty in doing this is that the brain wave, or EEG, tracing covers a field of six by eight inches, while the head and shoulders of a patient cover a field of 30 by 30 inches. For the eye to correlate the EEG with the bodily movements, the two fields should be of the same size.

This means the EEG record must be about two and a half feet from the camera lens and the patient eight feet from it. The terrific light intensity (200 units) necessary for such a depth of focus calls for a stop of f 22 and would burn the patient.

Numerous methods of solving the difficulty, including use of two television cameras, have been tried. Most of them are apparently too complicated or expensive or both to be practical.

The Boston doctors solved the problem by using a prism lens splitter and first surface mirrors with an adjustable auxiliary lens of four diopters for short EEG side of the picture. Both the patient at eight feet

SEISMOLOGY

Spot Weather Changes

► A COLD front sweeping across the Great Lakes can be spotted by seismographs in New York in "a matter of minutes," Father J. Joseph Lynch, S.J., of Fordham University, New York, has found.

Microseisms that travel about half a mile a second are the clue to changes in Great Lakes' weather detected in New York. Seismographs can pick up not only great, earth-jarring quakes, but also tiny quivers of the earth's surface. These are known as microseisms. Heavy trucks rolling down a highway can cause them. So can storms and hurricanes over the ocean. Scientists are now learning to use microseisms to spot and track such storms.

When micro-quake recording instruments in New York started picking up inland as well as Atlantic Coast sources for these microseisms, Father Lynch and Father Edward Berry, S.J., set out to find the cause.

From a station at West Park, N. Y., they eliminated the Hudson River as a possible source. Then from Hot Springs, N. C., they found that the microseisms were com-

ing from almost due north, thus confirming their suspicion that Lake Erie was responsible.

They believe that when a cold front moves over the Great Lakes, the weather disturbance causes waves in the water. These waves, when they hit the shore and bounce back, interfere with other oncoming waves, thus producing what are called "standing waves." Such standing waves pound on the lake bed to give rise to tiny vibrations that travel through the ground with a speed of about half a mile a second, Fathers Lynch and Berry conclude.

Science News Letter, August 29, 1953

ASTRONOMY

Red Stars May Be Youngest in Universe

► EXTREMELY RED stars in the Large Cloud of Magellan may be the youngest stars in that galaxy—only two to three million years old.

They were detected by Mrs. Virginia McKibben Nail and Dr. Harlow Shapley of Harvard College Observatory during a survey of the superluminous and supergiant stars in the Large Cloud system, the nearest galaxy to our own Milky Way. Their discovery is reported in the *Proceedings of the National Academy of Sciences* (May).

These extremely red stars are found in five constellations, counterparts in another galaxy to one we see in the wintertime sky, Orion, the hunter.

Except for the few red stars the astronomers detected, these extra-galactic constellations are composed mostly of supergiant blue stars, 10,000 times as bright as the sun.

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Questions

ASTRONOMY—When does fall begin officially? p. 138. . . .

ECOLOGY—What chemicals increase the numbers of sheep that can be grazed per acre? p. 137. . . .

GEOPHYSICS—How is the start of a new sunspot cycle discovered? p. 141. . . .

MEDICINE—Why should polio patients be tested for muscle weakness quite a while after their discharge? p. 136. . . .

SEISMOLOGY—What causes earthquake aftershocks? p. 137. . . .

SURGERY—What is the advantage of cooling patients prior to operations? p. 134. . . .

Photographs: Cover, Gulf Oil Co.; p. 131, Fremont Davis; p. 133, General Electric Company; p. 135, U. S. Air Force; p. 143, Cornell University; p. 144, Eastman Chemical Products, Inc.

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❁ **TOY SUBMARINE** floats just beneath the water's surface in bathtubs and fires two toy torpedoes from tubes on either side of its gray hull. When the trigger is released, both torpedoes are thrust out by a spring, traveling a few feet through the water and then rising to the surface.

Science News Letter, August 29, 1953

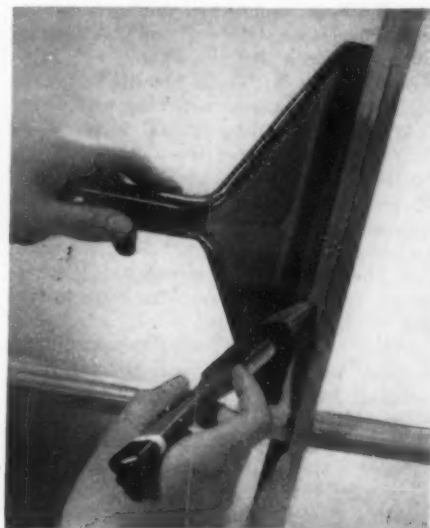
❁ **RUG FIRST-AID** equipment has been designed to help the housewife cope with more than 120 common stains on wool, rayon and cotton rugs and carpets. The set consists of four formulas, each guaranteed to remove safely a particular class of common stain.

Science News Letter, August 29, 1953

❁ **ANTISTATIC BRUSH** for photographic negatives has a radioactive material, polonium, stored in its plastic handle. When used on negatives, the brush sweeps away lint and dust, and the polonium neutralizes static electricity on the film so that it will not attract more dust.

Science News Letter, August 29, 1953

❁ **PAINTER'S GUIDE** resembles a sawed-off dustpan and is used to keep paint from being smeared where it is not wanted,



as shown in the photograph. Example: When the painter is coating walls, the hand-held butyrate plastic device keeps paint off door jambs and baseboards. Small pads beneath it prevent streaking when the tool is moved to a new position.

Science News Letter, August 29, 1953

❁ **SAFETY PROBE** enables television troubleshooters to check high voltage in video sets without danger. The highly shielded, well-grounded device works with kilovoltmeters and vacuum-tube voltmeters. It can be used on voltages as high as 60,000 volts D.C. with "complete safety to the operator."

Science News Letter, August 29, 1953

❁ **LEATHER KIT** includes all the materials needed for the enterprising woman to assemble her own alligator handbag. The maker reports the handbag can be put together without special tools or previous leather-working experience.

Science News Letter, August 29, 1953

❁ **FRYING PAN** lid lets smoke and steam escape, but keeps grease from splattering out and possibly starting fires in the kitchen. Fitting pots from eight to 11 inches in diameter, the lid features two sections, each perforated with small vents. The sections are screwed together so the holes are staggered. Water can be added to the pot contents with the lid in place.

Science News Letter, August 29, 1953

❁ **REPAIR PATCHES** for vinyl plastics come with a one-ounce bottle of liquid "glue" based on vinyl resins. Tears in aprons, inflatable toys, raincoats, shower curtains and other objects made of vinyl plastics thus can be fixed easily. Pinholes can be patched merely by brushing the solution over the rupture.

Science News Letter, August 29, 1953

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Do You Know?

If a cast-iron pot is scrubbed too vigorously with a detergent, its protective film of grease or oil is removed; some rusting will occur and food will stick.

Jet planes frequently leave vapor trails because moisture in their hot exhaust gases crystallizes in the cold air of high altitudes.

Insecticides in concentration may reduce soil fertility by slowing down the decomposition of organic matter.

Field brome grass is a promising cover crop for peach and cherry orchards where permanent sod culture is not satisfactory.

Historians have concluded that the Chinese used rockets with a black powder propellant as early as 3,000 B.C. in fireworks displays.